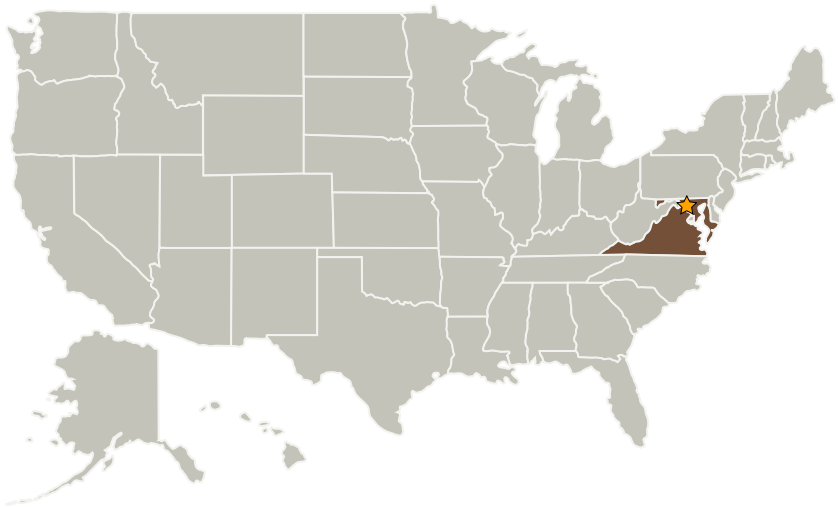
Interfacing the Paramesh Computational Libraries to the Cactus Computational Framework, Phase I

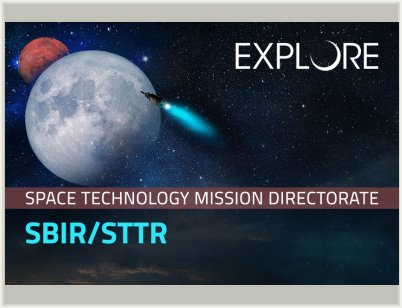
Completed Technology Project (2006 - 2007)

Project Introduction

We will design and implement an interface between the Paramesh computational libraries, developed and used by groups at NASA GSFC, and the Cactus computational framework, developed primarily by scientists at Louisiana State University, the RI on this proposal. Our innovation falls in the domain of adaptive mesh refinement (AMR), a technique to focus computational resources in regions of small scale dynamics. Our approach is innovative as it brings together one of the leading AMR packages (Paramesh) with Cactus, a widely used modular, parallel problem solving environment that is supported on multiple computing architectures. Our innovative proposal responds specifically the to the "Computing" subtopic in the solicitation in three areas: It will (1) reduce costs for current Paramesh users at Goddard, by providing access to the wide variety of validated tools already available through Cactus and which would otherwise need to be redeveloped at NASA; (2) facilitate sharing of novel algorithms between Paramesh and Cactus users worldwide through the existing and proven interoperability features provided by Cactus; and (3) position Paramesh users to benefit from the many next-generation computer science innovations that are actively researched by the core Cactus development team (such as grid computing) and other Cactus contributors.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Decisive Analytics Corporation	Supporting Organization	Industry	Arlington, Virginia

Primary U.S. Work Locations	
Maryland	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  - TX11.4 Information Processing
    - TX11.4.4 Collaborative Science and Engineering